12 December 1980, Volume 210, Number 4475 **SCIENCE**

Eradication

The ultimate step in the control of any disease is its eradication worldwide. This earthshaking goal has been achieved only in the case of smallpox. The last case of epidemic smallpox occurred in November 1977. The sole reported case thereafter was the result of a deplorable laboratory accident. Smallpox was an excellent candidate for eradication. It was a disease that caused high mortality and the survivors were often badly scarred. There had been a long history of major epidemics. There was an effective, stable, and thoroughly tested vaccine, and the immune population was generally identifiable. There was no known animal reservoir, nor was there a significant carrier state. The disease had been shown to be controllable by vaccination in many countries. Nonetheless, doubts about the outcome of the eradication campaign were initially expressed, even by actively participating scientists. The control of smallpox, before its eradication, imposed a continuing burden both in dollars and in health hazards. Despite most effective programs of immunization and quarantine, occasional outbreaks resulting from importation were inevitable. With eradication of the disease, this burden has been permanently removed and the savings thus effected extend in perpetuity.

The history of smallpox makes it attractive, indeed mandatory, to consider other diseases that may be ripe for eradication. This was the subject of a conference held in the Fogarty International Center at the National Institutes of Health on 27 and 28 May. Attention was given primarily to infectious diseases for which there exist means of interrupting transmission of the infectious agent from person to person. These means might include immunization of the susceptible population, antibiotic treatment of the infected population, or elimination of an obligate vector. Of the several diseases considered, the three that received the most attention were measles, poliomyelitis, and yaws.

A major effort is now being made in the United States to control measles. If it proves successful, as is generally expected, worldwide eradication of the disease and elimination of its serious consequences, such as subacute sclerosing panencephalitis, should also be possible. Measles differs from smallpox in a number of important ways. Although measles is considered a trivial disease in certain countries, it is a serious health problem in some developing areas of the world. Measles vaccine is relatively thermolabile and requires hypodermic administration. Measles is highly infectious and does not provide stigmata of prior disease.

There is ample evidence from many countries that poliomyelitis can be controlled by adequate immunization. The selection of the most appropriate vaccine for this disease is still in dispute, and satisfactory immunization in certain underdeveloped nations has yet to be demonstrated.

For yaws, a chronic and highly infectious skin disease caused by *Treponema pertenue* and seen most frequently in the tropics, the procedure would be entirely different. There is no satisfactory immunization at present. However, victims of yaws can be rendered noninfectious by a minimal course of penicillin, thereby interrupting the spread of the disease.

Man has proven himself to be effective in the extermination of other species. We no longer have the dodo bird, the great auk, or the passenger pigeon. We may now add to these extinct species the variola virus, except for that stored in freezer chests in several countries. Among the species of animals now threatened with extinction are the Bengal tiger, the sperm whale, and the white rhinoceros. Would it not be preferable to eliminate instead the measles virus, the poliomyelitis virus, and the *Treponema pertenue* of yaws?—DEWITT STETTEN, JR., *National Institutes of Health, Bethesda, Maryland 20205*